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Rich Consumers and Poor Producers

Quality and Rent Distribution in Global Value Chains

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INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

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ABSTRACT

In recent years, quality standards have become crucial for developing countries' agricultural production systems in gaining access to high-value markets abroad or at home. High-value supply chains offer opportunities for high profits, but in order to comply with the required standards, suppliers in developing countries often need extensive support from agrifood companies. We use a theoretical model to investigate under which conditions such synergies between suppliers and agrifood companies are sustainable, and how created rents are distributed, in a context of factor market imperfections and weak contract enforcement. We also derive the implications of development.

Keywords: contract farming, enforcement, development, rent distribution

JEL classification: C78, D23, O12, Q12

1. INTRODUCTION

Recent technological developments and globalization are transforming the industrial organization and international location of production.[1] One of the most important mechanisms underlying the globalization process lies in the transfer of advanced production capabilities to low-wage economies. These capabilities comprise both an increase in productivity and in product quality (Goldberg and Pavcnik 2007; Eswaran and Kotwal 1985). Sutton (2001) argues that the quality aspect is by far the more important element: poor productivity can be offset by low wage rates, but until firms attain some threshold level of quality, they cannot achieve any sales in global markets, however low the local wage level.

However, the introduction and spread of quality standards by rich countries have triggered a vigorous debate in the development community on their effects on poor producers in developing countries, and are claimed to further weaken claims on the beneficial effects of trade liberalization for poverty reduction.[2] Some have argued that the imposed standards are reinforcing global inequality and poverty as (a) they are introducing new (non-tariff) trade barriers, (b) they are excluding small, poorly informed, and weakly capitalized producers from participating in high quality supply systems, and (c) large and often multinational companies are extracting all the surplus through their bargaining power within the chains (Augier et al. 2005; Brenton and Manchin 2002; Reardon and Berdegué 2002; Unnevehr 2000; Warning and Key 2002).

This debate has been especially active in the context of global supply chains of agricultural and food products, for several reasons (Dolan and Humphrey 2000; Reardon et al. 1999). On the one hand, agriculture in developing countries, and exports of agricultural commodities, are seen as a very important potential source of pro-poor growth (World Development Report 2008). On the other hand, rich country food safety and quality standards, both from private and public sources, have tightened dramatically over the past decade, strongly affecting international trade and global value chains in these commodities (Jaffee and Henson 2005).

However, there is considerable uncertainty with respect to the validity of the above-mentioned arguments, and more generally the welfare implications of high-standards trade (Swinnen 2007). First, it is argued that while quality and safety standards indeed make production more costly, at the same time they reduce transaction costs in trade (Henson and Jaffee 2007; Reardon and Farina 2005). Second, recent empirical studies show that smallholder participation in high quality global supply chains is much more widespread than initially argued.[3]

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[1] One issue that has attracted much attention is outsourcing (e.g. Grossman and Helpman 2005). Another issue, more closely related to our paper is the role of vertical integration in the globalization process. A series of models have studied under which conditions two firms will vertically integrate, either backward or forward, and how this affects the incentives to invest or innovate (Acemoglu et al. 2005; Aghion et al. 2006), drawing upon the earlier work of Williamson (1985), Grossman and Hart (1986), Hart and Moore (1990)). Some of the papers have considered the impact of weak enforcement institutions (Khanna and Palepu 2006; Acemoglu et al. 2005). The models typically assume (a) that both firms can make investments or take over the other firm (an exception is Macchiavello (2006), who allows for financial constraints), and (b) that vertical integration is a 0–1 decision, i.e. they compare the two extremes of total ownership and total separation; or in Williamson (1975)'s terminology: "hierarchy" versus "markets". Our analysis studies whether contracting (a "hybrid" form of organization in Williamson's terms) is sustainable and what its efficiency and equity effects are.

[2] There is still debate on the impact of trade (liberalization) and the integration of developing countries in global trade on economic growth (Dollar and Kraay 2002; Irwin and Tervio 2002; Rodriguez and Rodrik 2001). There is even less consensus about the impact of trade on poverty. While some advocate trade liberalization as a major potential engine for global poverty reduction (Aksoy and Beghin 2005; Anderson and Martin 2005; Bhagwati and Srinivasan 2002; Dollar and Kraay 2004), in a broad survey of the evidence, Winters et al. (2004:106) conclude that "there can be no simple general conclusion about the relationship between trade liberalization and poverty".

[3] Some studies indicated that small farmers are excluded because of increasing food standards (Reardon et al. 2003; Key and Runsten 1999; Gibbon 2003; Weatherspoon and Reardon 2003; Kherralah 2000). For example, evidence from Kenya, Zimbabwe and Cote d'Ivoire suggests that horticulture exports are increasingly grown on large industrial estate farms, thereby excluding smallholder suppliers in the export supply chain (Dolan and Humphrey 2000; Minot and Ngigi 2004). Others find very different effects. For example, Minten et al. (2009) show that in Madagascar most fresh fruit and vegetable production for exports is on very small farms, often on a contract-basis with the agrifood industry, and with important positive effects on farmers'

There is much less evidence on the third critique, which is the rent distribution within these supply chains. Empirically, most studies have focused on the exclusion issue and very few studies actually measure welfare, income or poverty. The few studies that do measure welfare effects find positive effects for poor households in developing countries who may participate either as smallholder producers or through wage employment on larger farming companies (Maertens and Swinnen 2009; Maertens et al. 2008; Minten et al. 2009). What is remarkable is that these strong benefits occur in several of these cases despite the fact that trade is organized by monopsonistic exporting companies.

The objective of this paper is to formally analyze under which conditions poor producers can benefit from the introduction of quality standards in response to rich consumers' demand. The paper develops a model to derive the efficiency and distributional effects of quality standards in supply chains taking into account key characteristics of the supply chains between rich consumers and poor producers in developing countries; and how the process of development changes these effects.

One key characteristic is that the introduction of higher quality requirements has coincided with the growth of contracting and technology transfer (Swinnen 2007). Contracts for quality production with local suppliers in developing countries not only specify conditions for delivery and production processes but also include the provision of inputs, credit, technology, management advice etc. (Minten et al. 2009; World Bank 2005). The latter are particularly important for local suppliers who face important local factor market imperfections – another key characteristic. In particular imperfections in credit and technology markets are typically large, which implies major constraints for investments required for quality upgrading, especially for local firms and households who cannot source from international capital markets. However, the enforcement of contracts for quality production is difficult in developing countries which are often characterized by poorly functioning enforcement institutions – a third important characteristic. These enforcement problems can add significantly to the cost of contracting and may prevent actual contracting to take place.[4]

Our model starts from the assumption that vertical coordination can emerge as a spontaneous response to on the one hand the demand for high quality products and on the other hand suppliers' credit constraints. First, we show that the extent of inefficient separation (defined as the absence of socially efficient contracting) is increasing in the enforcement costs and in the value of specific inputs required for high value production.

Second, we show that local suppliers in developing countries can benefit importantly from integration in global supply chains. The distribution of the gains from contracting depends on the overall rent that can be created by the contract and on the enforcement costs. Transfers from one agent to the other play a crucial role. If third party enforcement (formal or informal) is very costly, buyers may prefer to make the contract self-enforcing by means of an additional money transfer to the supplier, which we call an "efficiency premium". The size of the efficiency premium depends on the supplier's outside options and on the cost of enforcement. Because of this efficiency premium, weak contract enforcement may under some conditions increase the supplier's income.

Third, we find that "development", modeled as an exogenous improvement of factor markets and enforcement institutions, may have some non-intuitive effects on both equity and efficiency, and may hurt some of the contracting parties under some conditions.

Our analysis is related to other research fields, in particular to research on FDI spillovers which suggests that foreign companies are more likely to engage in vertical integration and vertical coordination (Aghion et al. 2006), and on the distribution of rents within companies, domestically (Blanchflower et al. 1996) and internationally (Borjas and Ramey 1995; Budd et al. 2005). The analysis also relates to a large body of research on interlinking markets (Bardhan 1989; Bell 1988) and on enforcement in contracts and credit markets (Genicot and Ray 2006; Gow and Swinnen 2001; Mookherjee and Ray 2002).

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productivity. Similar results are found by studies in Asia (Gulati et al. 2006), in Eastern Europe (Dries and Swinnen 2004), and in China (Wang et al 2009).

[4] There is an extensive literature on the role of formal and informal enforcement institutions in development, e.g. North (1990), Platteau (2000), Greif (2006), Fafchamps (2004), Dhillon and Rigolini (2006), etc.

The paper is organized as follows. The next section sets up the basic model. Section 3 explores the option of third-party enforcement of contracts, and Section 4 and 5 assess the impact of respectively competition and development on efficiency and equity within the contract. Finally, Section 6 concludes.

2. THE MODEL

Our specification is an extension of Kranton and Swamy (2008)'s model of transactions between exporters and local producers in Colonial India. In these transactions, exporters provide capital, while producers provide labor. However, as contract enforcement institutions are assumed to be weak, contracts need to be made self-enforcing. Kranton and Swamy derive the conditions under which such contracts are feasible. We apply this model to the more general case where a local household or company in a developing country – which we refer to as "the supplier" – can sell products to a trader or a retailing or processing company – which we refer to as "the buyer". This buyer can sell the product (possibly after processing) to consumers – either domestically or internationally – at a unit price p_h.

To produce a high-value product, the supplier needs to invest an amount of labor l. We assume the supplier's opportunity cost of labor is $\overline{l}$. For instance, if his best alternative is to produce a low-value product for the local market, $\overline{l} = p_l$, i.e. the low value product unit price.

The production of high-value commodities requires an extra capital investment k to buy specific inputs (e.g. fertilizers, credit, seeds, technology). We assume that the supplier does not have access to capital by himself because of credit market imperfections. This is a realistic assumption as in many developing countries local producers and households face important factor market constraints (e.g. Dercon and Christiaensen 2007). These constraints effectively prevent the supplier from producing high-value raw material and hurt both suppliers and buyers: they prevent suppliers from producing for the market and constrain access to raw materials for the processing firm.

If the buyer has access to the required capital, he can offer a contract to the supplier, which includes the provision of inputs on credit and the conditions (time, amount and price) for purchasing the farmer's product. This, again, is a realistic case since the buyer may have better collateral or more cash flow or face lower transport or transaction costs in accessing the inputs. We refer to the buyer's opportunity cost of capital as $\overline{k}$, with $\overline{k}$ depending both on the capital intensity of the crop, and on the buyer's potential return to alternative investments.

We assume an indivisible production function and a fixed proportions production technology. The net value that is created when the farmer and the buyer decide to collaborate, amounts to $\theta = p_h - \overline{l} - \overline{k}$. We assume that the contract terms are determined as in a simple principle-agent model, in which the supplier receives his outside option, and the buyer extracts the entire surplus. Under perfect enforcement of contracts, the respective incomes of the farmer and the buyer would be given by $Y_{pf} = \overline{l}$ and $\Pi_{pf} = p_h - \overline{l}$.[5] However, when contracts are legally unenforceable – as is the case in many developing and transition countries - opportunistic behavior may lead to hold-ups if one of the agents has an attractive alternative to contract compliance (cfr. Williamson 1981).[6] First, the farmer can divert the received inputs to other uses, such as selling them or applying them to other production activities (e.g. subsistence crops). We assume that if the farmer violates a contract, he suffers a reputation cost φ^f.[7] This way, he can always at least earn an income $\overline{l} + \overline{k} - \varphi^f$.[8]

[5] Nash (1953) proposes that the sharing rule be ½ if risk is ignored, and if information is assumed to be perfect. This approach is for example taken by Diamond (1982). However, others suggest to use a different sharing rule - especially in the case of large firms dealing with smaller suppliers - since take-or-leave offers are much more common than a formal bargaining process (e.g. Svejnar 1986). We follow Kranton and Swamy (2008) in allocating all the surplus to the buyer, which transforms the model into a principal agent model.

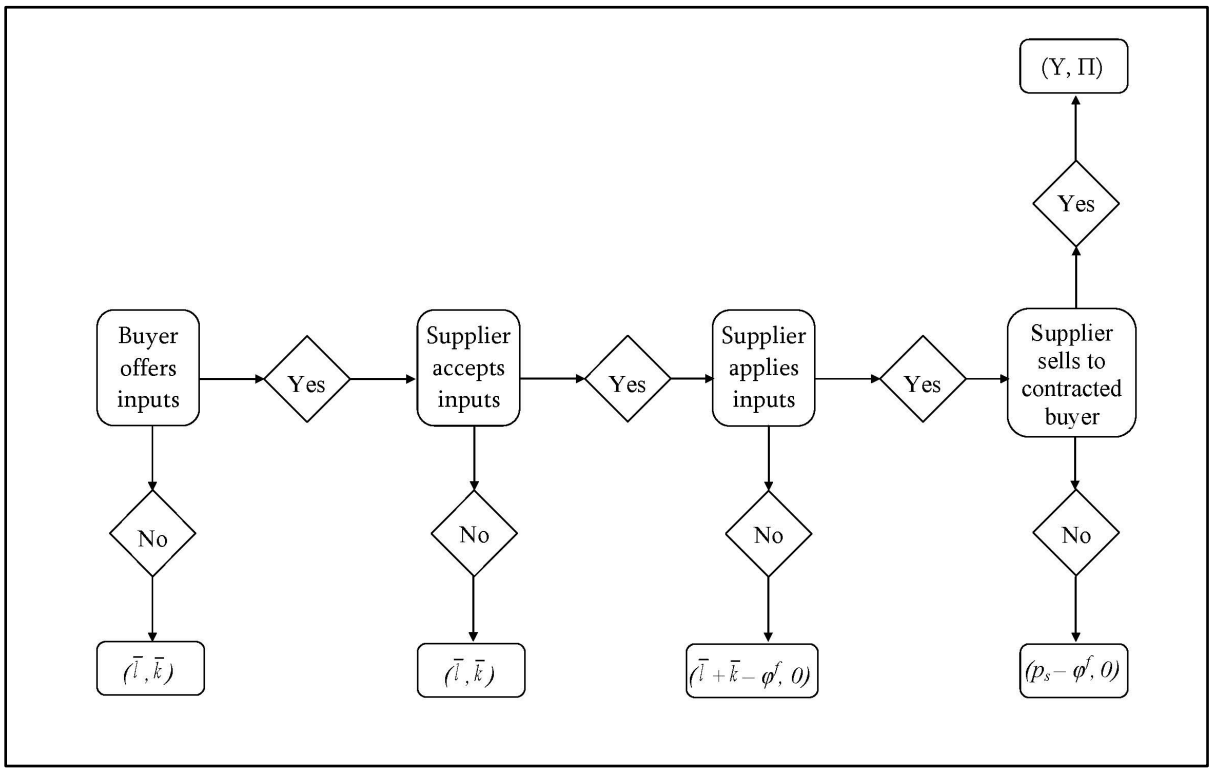
[6] Note that what we call "contracts" here, are in practice often informal oral agreements.

[7] This can be interpreted in a broad sense not only as a pure loss in terms of reputation, but also as a social capital cost or a moral loss, or the loss of future trade opportunities (cfr. Klein 1992; Moore 1992; McLeod 2006). Alternatively, this could be modeled as a repeated game, where a high discount factor in a repeated game would be equivalent to a high reputation cost φ^f in our model.

[8] Note that we assume that the supplier's opportunity cost of the received capital is equal to the buyer's opportunity cost of capital.

An alternative way to hold up the buyer is when the farmer applies the inputs to the crops, as agreed in the contract, but then sells the high value output to an alternative buyer. Such "side-selling" can be profitable as the alternative buyer does not need to account for the cost of the provided inputs. However, the competing buyer may not value the product as much as the contract buyer who outlined the production process from the start according to his specific needs. To account for this, we define p_s as the "spot market price", i.e. the price offered by competing buyers.[9] By side-selling, the farmer's payoff is $p_s - \varphi^f$. The different payoffs under each contingency are shown in Figure 1.

Figure 1. Game tree with various holdup opportunities



For the supplier to voluntarily comply with the contract, his income from the contract Y must cover his disagreement payoff (i.e. $Y \geq \bar{l}$), and be at least as much as his outside options, obtained from breaching the contract, i.e. his incentive compatibility constraints must be satisfied: $Y \geq \bar{l} + \bar{k} - \varphi^f$ and $Y \geq p_s - \varphi^f$.[10] The resulting contract (Y, Π) will then be defined by

$$Y = \max\left(\bar{l}, \bar{l} + \bar{k} - \varphi f, ps - \varphi f\right) \quad (1)$$

and

$$\Pi = p_h - Y. \quad (2)$$

[9] p_s reflects the degree of buyer-specificity of the production standards (the higher the specificity of the product or the quality standards, or the higher the transaction costs of switching, the lower p_s is). If the product is homogenous, $p_h = p_s$. If high-quality products are valued only as much as low-quality products, $p_s = p_l$. In some cases, p_s is even lower than p_l, e.g. if there is no local market (yet) for the high-quality product. An example is the case of broccoli and cauliflower in Guatemala, as discussed by Glover and Kusterer (1990).

[10] We assume the buyer can commit to a pre-agreed price, in other words, we do not allow for ex post renegotiation of the contract price. If this assumption is relaxed, a new condition for contract feasibility emerges (see equation (5)).

This contract is feasible only if it also satisfies the buyer's participation constraint $\Pi \geq \bar{k}$, which imposes a lower bound on p_h. If p_h is sufficiently high, it is possible to adjust the contract terms such that the respective buyer's participation constraints as well as the supplier's incentive compatibility constraints are simultaneously satisfied. In the adjusted contract, the buyer pays the supplier a premium on top of the perfect enforcement outcome to prevent violation of the contract after the inputs are delivered. This is equivalent to the concept of "efficiency wages*"* (Salop 1979), whereas the employer pays a higher wage to his employees to minimize their incentive to quit and seek a job elsewhere, after having trained them. We therefore refer to the difference between the producer's payoff under (costless) perfect enforcement (Y_{pf}) and under costly enforcement (Y) as an "efficiency premium" ε, defined as

$$\varepsilon = max\ (0,\ \bar{k} - \varphi^f,\ p_s - \bar{l} - \varphi^f). \tag{3}$$

Making the contract "self-enforcing" by paying an efficiency premium is a rational strategy for the buyer, as it can earn him a better payoff than his outcome when being held up, or upon contract breakdown.[11] It follows from (3) that $\partial\varepsilon/\partial\bar{k} \geq 0$, $\partial\varepsilon/\partial\varphi^f \leq 0$, and $\partial\varepsilon/\partial p_s \geq 0$: the higher the famer's opportunity cost of using the specific inputs for other purposes, or the higher the price is that opportunistic buyers offer for the supplier's produce, the higher this efficiency premium must be. A higher reputation cost from breaching the contract reduces the required efficiency premium.

Hence, as long as the contract is enforced, the supplier's income will be increasing in his ex ante as well as his ex post outside options.

However, contracts will only be feasible for a specified range of parameter values. The conditions for contract feasibility are summarized in the following restriction on p_h:

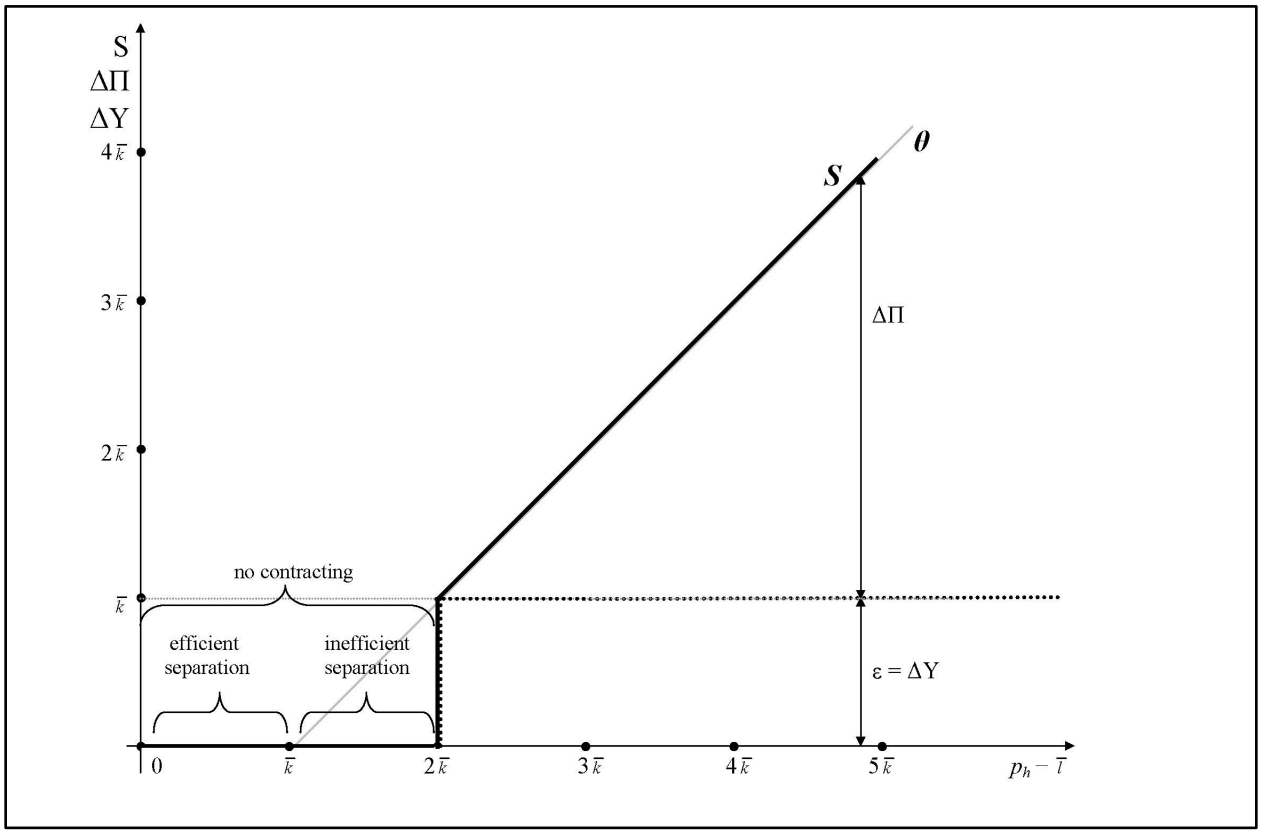
$$p_h \geq p_h^{min} = max\ (\bar{l} + \bar{k}\ ,\ \bar{l} + 2\bar{k} - \varphi^f,\ p_s + \bar{k} - \varphi^f) \tag{4}$$

This condition captures several reasons for potential contract failure. If $p_h < \bar{l} + \bar{k}$, the net surplus of the transaction will be negative, and there is no incentive for contract formation. We refer to this situation as "efficient separation". If $p_h > \bar{l} + \bar{k}$ but smaller than $\bar{l} + 2\bar{k} - \varphi^f$, or than $p_s + \bar{k} - \varphi^f$, there is no price the buyer can offer to the supplier in order to make him comply with the contract. In other words, the premium that the buyer has to pay the supplier not to breach the contract is larger than the buyer's gross revenues: he cannot afford this. Under these conditions, the contract will not be realized, even if it would be socially efficient to do so. This is referred to as "inefficient separation". Hence, contracting is more likely to break down if the value in the chain (θ) is low (p_h relative to the opportunity cost of capital $\bar{k}$ and labor $\bar{l}$), if there are more alternative sales outlets for high value products (i.e. p_s is high), and if farm reputation costs φ^f are low. Under these conditions, suppliers will still be able to earn their opportunity cost of labor.

Figure 2 illustrates these various separation effects.

[11] This result corresponds to the findings of Bardhan and Udry (1999:218). They mention that, in the context of mercantile contracts, if there is no possibility to monitor, simple efficiency wage considerations suggest that in order to keep a long distance trading agent honest, the agent has to be paid by the merchant a wage higher than the agent's reservation income. However, in more "collectivist" forms of enforcement (in which e.g. the whole community is jointly liable if one of its members cheats), this wage need not be as high, as the penalty for cheating is higher or else peer monitoring makes cheating more difficult.

Figure 2. Surplus sharing under holdup



For illustrative purposes we use specific numerical values for some of the parameters: $\varphi^f = 0$, and $p_s = \bar{l}$.[12] The figure shows how the gains in suppliers' income ($\Delta Y = Y - \bar{l}$) and in buyers' income ($\Delta\Pi = \Pi - \bar{k}$) change with the value of the commodity p_h. The line S represents the surplus that can be created, and the kink in the S function reflects the contract breakdown effect. In the illustrated case with the specific numerical values, contracting and surplus creation will only occur if $p_h - \bar{l} \geq 2\bar{k}$ (cfr. equation (4) with $\varphi^f = 0$). Efficient separation occurs for $p_h - \bar{l} < \bar{k}$, and contracts are not possible due to inefficient separation when $\bar{k} \leq p_h - \bar{l} < 2\bar{k}$. If $p_h - \bar{l} > 2\bar{k}$, contracting is feasible and surplus is created. The buyer has to pay the supplier an efficiency premium in order to prevent the latter from breaching the contract. The size of the efficiency premium depends on the supplier's ex post outside options, i.e. his payoff from diverting the received inputs or from side-selling, as follows from condition (3). The resulting surplus distribution is $\Delta Y = \varepsilon$, and $\Delta\Pi = \theta - \varepsilon$.

Until now, we have assumed that the buyer can commit to the agreed price. This is equivalent to stating that when renegotiating, he suffers a reputation loss of φ^p which is high enough to discourage him from opportunistic behavior.

As an extension to the model, we can relax this condition on φ^p. This allows the buyer to renegotiate the price upon receipt of the goods, by offering the supplier his best alternative at that moment, i.e. p_s. This can only occur if, from the supplier's perspective, the option of input diversion strongly dominates the option of side-selling. The buyer's payoff is then $p_h - p_s - \varphi^p$. He will renegotiate if

[12] Note that these parameter assumptions do not affect our main conclusions.

$$\varphi^{p} < \varphi^{p}_{min} = \bar{k} + \bar{l} - \varphi^{f} - p_s, \quad (5)$$

If φ^p is so small that the supplier expects the buyer to renegotiate, contracts will not be feasible as the supplier is always better off by diverting the inputs than by applying them according to the contract. Note that if alternative high-value product buyers are scarce (p_s low), this constraint on φ^p will be more stringent.

3. ENDOGENOUS THIRD PARTY ENFORCEMENT

Another way to enforce contracts is by investing in supervision, or by engaging third party enforcement, if it is not prohibitively costly. Less inefficient separation will then occur, but the total contract surplus will be reduced. Assume that M is the cost of guaranteed enforcement through supervision or third party enforcement, and that M is paid ex ante.[13] M could be the cost of hiring lawyers or paying the local mafia to enforce the contract, or wages of local staff to monitor contract compliance. Minten et al. (2009) document investments in extensive supervision and monitoring systems in African horticultural exports where quality characteristics are unobservable. But also in the case quality characteristics are observable, monitoring can be used to ensure contract compliance and avoid input diversion or side-sales of the crop (e.g. Conning 2000). Another example of extra costs for contract enforcement is where buyers offer suppliers additional inputs as fertilizers and pesticides for their own food crops to avoid input diversion (e.g. Govereh et al. 1999).

All these examples can be modeled as enforcement through an extra cost M. The surplus is reduced by an amount M to $p_h - \bar{k} - \bar{l} - M$, and the buyer's income is $p_h - \bar{l} - M$.[14] Hence, it is in the buyer's interest to invest in supervision if $M < \varepsilon$ with ε defined as in equation (3). As a result, supervision is more likely to occur with (a) higher $\bar{k}$, (b) higher p_s, (c) lower φ^f, and (e) lower $\bar{l}$. The opportunity for supervision or third party enforcement will impose an upper limit to the supplier's payoff from the contract. The modified contract (Y, Π) can then be written as:

$$Y = \begin{cases} max\,(\bar{l}\,,\ \bar{l} + \bar{k} - \varphi^f,\ p_s - \varphi^f) & if\ M \geq \varepsilon \\ \bar{l} & if\ M < \varepsilon \end{cases} \quad (6)$$

$$\Pi = \begin{cases} p_h - max\,(\bar{l}\,,\ \bar{l} + \bar{k} - \varphi^f,\ p_s - \varphi^f) & if\ M \geq \varepsilon \\ p_h - \bar{l} - M & if\ M < \varepsilon. \end{cases} \quad (7)$$

The condition for contract feasibility becomes:

$$p_h \geq p_h^{min} = min[max(\bar{l} + \bar{k}\ ,\ \bar{l} + 2\bar{k} - \varphi^f,\ p_s + \bar{k} - \varphi^f),\ \bar{l} + \bar{k} + M]. \quad (8)$$

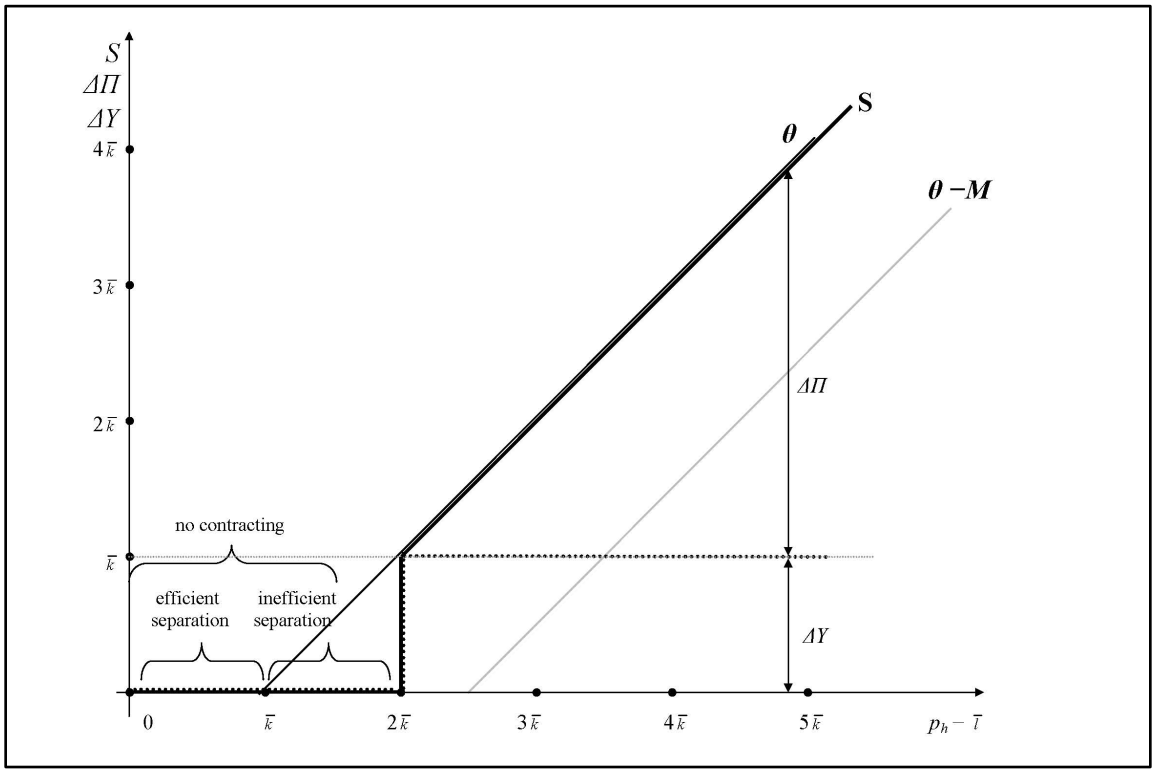
Equations (6) through (8) imply that income effects are non-linear and depend, among other things, on the value $\theta(p_h)$. In the range of p_h where contracts are feasible with, but were not feasible without, third party enforcement (see Figure 3(b) for $p_h - \bar{l}$ in $[1.5\bar{k}\ ;\ 2\bar{k}\ ]$), the buyer's income will increase, and the supplier's payoff will equal his opportunity cost of labor, as the buyer captures all rents. In this interval, contracting is enforced with M. However, the supplier will not benefit from this directly. He can only benefit indirectly, in case third party enforcement leads to an increased demand for his products ex ante, and hence an increased opportunity cost of labor.

[13] As our simple model assumes perfect information, this assumption does not affect the results.

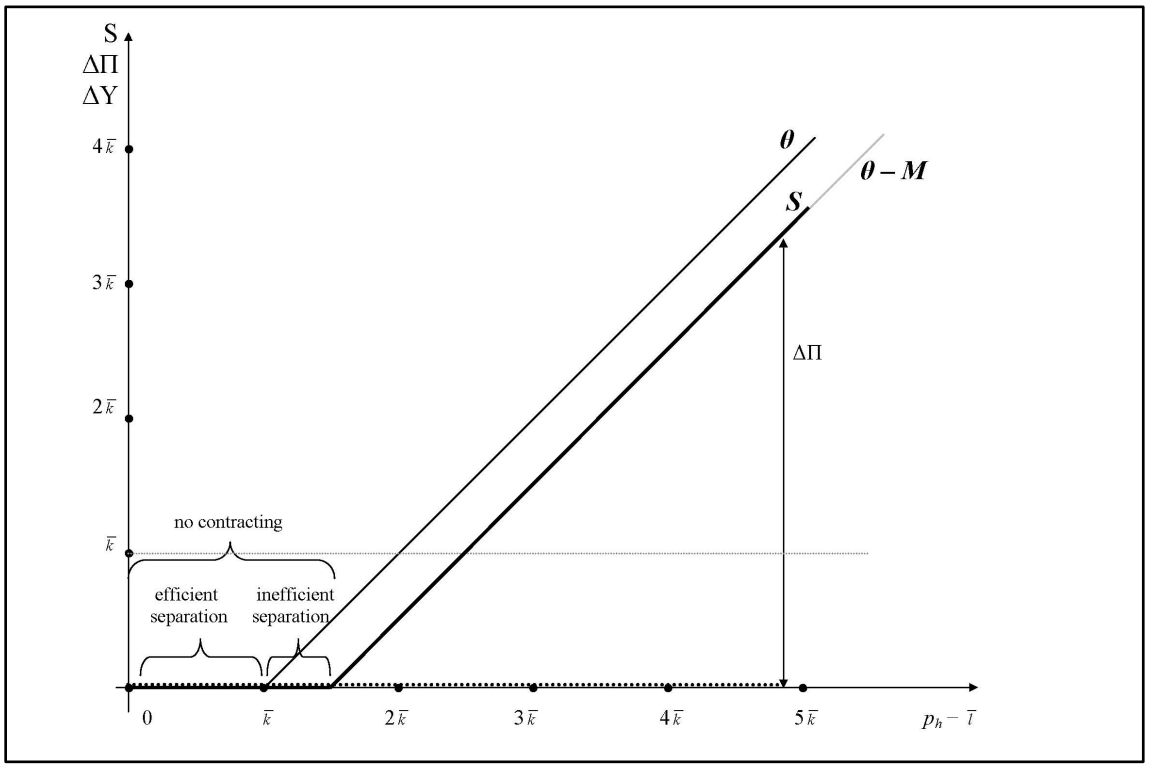
[14] Note that in this paper, we consider the social gains of the contract as the sum of the gains of the supplier and the buyer. As such, M is a cost to society. One could argue that payments to third parties, be it lawyers, or local people hired to supervise, also benefit society and should be included in the gains, rather than the costs.

Figure 3. Enforcement mechanism choice and surplus sharing; (a) high *M*, (b) low *M*.

(a)



(b)



For $p_h - \overline{l} > 2\overline{k}$, the supplier is expected to be worse off with third party enforcement. This is also illustrated in Figure 3(b). As $M < \varepsilon$, it is profitable for the buyer to invest in third party enforcement as it is cheaper than the efficiency premium he would have to pay the supplier otherwise to ensure contract compliance. This implies that over this interval, the supplier's income is reduced, since he no longer receives the efficiency premium.

4. THE IMPACT OF COMPETITION

The traditional argument is that competition (Ψ, with $0 \leq \Psi \leq 1$) between buyers has a positive impact on suppliers: it increases demand for their product and, if the different buyers do not collude, competition will drive up the suppliers' price (Inderst and Mazzarotto 2008). Our model also yields this competition effect. Competition will increase the supplier's outside options (through $\bar{l}$ and p_s) and thus increase his share of the contract value. Formally, the introduction of competition between private buyers will increase the ex ante outside option suppliers face at the time of contract negotiation. Indeed, not only the non-contract outcome, in which they continue to produce for subsistence remains an option, but they can also go to another buyer to see which contract terms he would offer them. In our model, this implies an increase in the supplier's opportunity cost of labor $\bar{l}$: $\partial \bar{l} / \partial \Psi > 0$.

Second, the introduction of competition between private buyers may in some cases bring an end to the "quiet life" of the processing company management (Hicks 1935). The "quiet life" hypothesis basically states that the manager's incentive for cost reduction and innovation will be much stronger in a competitive environment. There is an extensive literature on how competition and privatization changed manager and firm behavior in transition countries (Roland 2000; Konings and Walsh 1999). To keep the model simple, we assume that improved management reduces inefficiencies in marketing, resulting in a higher p_h. This increases the contract surplus.

However, competition will not only affect the demand for output, but also the provision of inputs. This second effect is related to the standard economic theory of credit markets which predicts that competition between lenders will reduce the provision of credit (e.g. Petersen and Rajan 1995). With (increased) competition between buyers, input provision may be unsustainable, and contracting may break down although it would be socially efficient. In terms of our model, competition between buyers will reduce the supplier's reputation cost φ^f from breach of contract ($\partial \varphi^f / \partial \Psi < 0$). One reason is that the number of agents operating in the market is expected to negatively affect the penalty for contract breach (Hoff and Stiglitz 1998), because the threat of cut-off from future contract arrangements is less stringent, as there are other contract partners available. This argument is in line with Eswaran and Kotwal (1985), who state that reputation is an effective weapon against moral hazard only for suppliers "of those factors that are in excess supply". In other words, a higher demand for the supplier's produce lowers his reputation cost from breaching a contract. A second reason why the penalty for breaching a contract is lower with more competition, is that reputation effects are less prevalent in a competitive market, where agents are less likely to coordinate and share information (see e.g. Zanardi 2004). Moreover, local information networks work less well when the number of agents expands, as it costs more in terms of effort, money, and/or time to let information spread among a larger group of agents. This will make it easier for an opportunistic supplier to find an alternative buyer.

Third, increased competition may as well give rise to an increased ex post outside option of the supplier through a higher number of opportunistic buyers, i.e. an increased p_s ($\partial p_s / \partial \Psi > 0$). The reason is that with more buyers, it will be harder to behave monopsonistically, or to coordinate or collude among buyers. Moreover, more buyers may imply a wider diversity of buyers, including buyers who potentially have a higher valuation of the high value product.

We can now summarize the impact of competition on farm incomes (Y) and on contract feasibility (p_h^{min}) as follows:

$$\frac{\partial Y}{\partial \Psi} = \frac{\partial Y}{\partial \bar{l}} \cdot \frac{\partial \bar{l}}{\partial \Psi} + \frac{\partial Y}{\partial p_h} \cdot \frac{\partial p_h}{\partial \Psi} + \frac{\partial Y}{\partial \varphi^f} \cdot \frac{\partial \varphi^f}{\partial \Psi} + \frac{\partial Y}{\partial p_s} \cdot \frac{\partial p_s}{\partial \Psi} \tag{9}$$

$$\frac{\partial [p_h - p_h^{\min}]}{\partial \Psi} = \frac{\partial p_h}{\partial \Psi} - \frac{\partial p_h^{\min}}{\partial \bar{l}} \cdot \frac{\partial \bar{l}}{\partial \Psi} - \frac{\partial p_h^{\min}}{\partial \varphi^f} \cdot \frac{\partial \varphi^f}{\partial \Psi} - \frac{\partial p_h^{\min}}{\partial p_s} \cdot \frac{\partial p_s}{\partial \Psi} \tag{10}$$

as $\partial Y/\partial \bar{l} \geq 0$, $\partial Y/\partial p_h = 0$, $\partial Y/\partial \varphi^f \leq 0$, $\partial Y/\partial p_s \geq 0$, $\partial p_h^{min}/\partial \bar{l} \geq 0$, $\partial p_h^{min}/\partial \varphi^f \leq 0$, $\partial p_h^{min}/\partial p_s \geq 0$, (in each case the effect is zero when the constraint is not binding and positive or negative when the constraint is binding). From equation (9) it follows that – as long as contracts do not break down – competition will induce an increase in farm surplus from production, since all terms of the formula are positive (or zero). However, from equation (10) it follows that competition may make contracting less feasible. The first term on the right-hand side of equation (10) is positive, meaning that competition may enhance efficiency and as such have a positive (partial) effect on contract feasibility. The next three terms, however, are negative, implying that competition increases the lower bound to p_h and hence can have a negative effect on contract feasibility.[15]

Finally, notice that the effects of competition can be mitigated by third party enforcement. Indeed, if M is sufficiently low (in the sense that $M < \varepsilon$) and the buyer resorts to third party enforcement, the impact of competition will be limited to the first term in each of equations (9) and (10), i.e. the impact of an increased ex ante outside option ($\bar{l}$).[16]

[15] Note that, if φ^p is small, competition can have an additional positive (partial) effect on contract feasibility. By increasing p_s, the condition for contract compliance by the buyer ($\varphi^p \geq \varphi^p_{min}$, cfr. equation (5)) is weakened, thus improving contract feasibility. This comes down to the argument made earlier by Klein et al. (1978), saying that competition between buyers may reduce the supplier's susceptibility to a hold up by the buyer, and as such improve investment incentives.

[16] Note that competition may increase ε, by reducing φ^f and/or increasing p_s, and as such induce third party enforcement to be binding.

5. THE IMPACT OF DEVELOPMENT

Development is a broad concept and is both cause and consequence of the formation of interlinked contracts. Here we look specifically at the impact of changes in two factors which we assume to be determined exogenously and which coincide with "development" (Ω): the improvement of (public) enforcement of contracts and the improvement of the functioning of factor markets. First, if enforcement becomes less costly with the emergence and better functioning of formal institutions, this will affect the emergence and distributional effects of interlinked contracts. Second, if factor markets develop, producers' access to specific inputs will become less constrained, and this will obviously also affect contractual arrangements. To precisely identify the mechanisms, we analyze these effects separately.

Improvement of Contract Enforcement Institutions

It is generally observed that formal enforcement institutions become more effective with development (Djankov et al. 2003; North 1990). In our model, this implies that third party enforcement becomes less costly ($\partial M/\partial\Omega < 0$). An obvious implication is that for a larger range of p_h, third party enforcement will be preferred to efficiency premium payment. This will have implications for both contract formation as well as for rent distribution.

First, a decreased M can extend the range where contracts are enforceable. Indeed, as M decreases, there is a wider interval for which $p_h - \bar{k} - \bar{l} - M > 0$. While the inefficient separation interval is $[\bar{k}, 2\bar{k}]$ with $M = 1.5\bar{k}$, it reduces to $[\bar{k}, 1.5\bar{k}]$ with $M = 0.5\ \bar{k}$ in Figure 3.

Second, when third party enforcement was already the cheapest option for contract enforcement with a higher M, third party enforcement now becomes cheaper. This increases the contract surplus, with a positive effect on efficiency.

However, thirdly, as the cost of third party enforcement decreases, it will substitute for efficiency premium payment for certain values of p_h. Indeed, as seen from equations (6) and (7), a buyer will appeal to third party enforcement if $M < \varepsilon$, with $\varepsilon = max\ (0,\ \bar{k} - \varphi^f,\ p_s - \bar{l} - \varphi^f)$. Hence, the smaller M, the more likely it is that the buyer will invoke third party enforcement instead of an efficiency premium. This will affect the contract surplus S. Indeed, $S = \theta - M$ where third party enforcement is employed, while $S = \theta$ where the efficiency premium is employed.

Where cheaper third party enforcement will substitute for efficiency premiums, the distribution of the contract surplus will also be affected. Indeed, in Figure 3(a), where $M = 1.5\bar{k}$, efficiency premium payment is used to enforce contracts for $p_h - \bar{l} > 2\bar{k}$. In Figure 3(b), no efficiency premium is paid, and third party enforcement is used instead. This leads to an income loss for the supplier.

As a conclusion, we can state that improved enforcement institutions often, but not in all circumstances, benefit both contracting parties. Indeed, for some values of M, only the buyer will gain, and the seller will lose, as cheaper third party enforcement will deprive the latter from his efficiency premium, and as such reduce his income. This is consistent with other literature (e.g. Anderson and Young 2002), stating that better enforcement does not necessarily benefit contracting agents.

Factor Market Development

The development of factor markets is expected to relax credit constraints and to improve access to input markets. With this, suppliers are expected to obtain better access to profitable market opportunities outside of the contract, hence $\bar{l}$ will increase ($\partial\bar{l}/\partial\Omega > 0$). The effect is similar to the one described in Section 4: Y will increase, as long as p_h is larger than p_h^{min}. An increase in $\bar{l}$ may however also induce an increase in p_h^{min}, and as soon as $p_h < p_h^{min}$, contracts will break down.

Apart from factor markets, also output markets may develop. If local consumers become richer, they may acquire stronger preferences for high value food products (e.g. Swinnen et al. 2008). This may

make it easier for suppliers to side-sell high value products at better prices: p_s will increase ($\partial p_s/\partial \Omega > 0$). As long as third party enforcement is too costly, this will increase the supplier's income from the contract, *Y*.

Development can change the organization of agricultural production even more dramatically, by giving suppliers direct access to inputs. If credit constraints are relaxed, or input markets develop, buyers do no longer need to give inputs on credit. Pure output contracts become feasible. With pure output contracts, the set up of the model will change into a standard specific investment setting à la Klein et al. (1978). Buyers no longer need to give efficiency premiums to make suppliers comply with the contract. This will reduce *Y*, the suppliers' income from the contract, but may increase contract feasibility by reducing inefficient separation.[17]

Hence, as a conclusion, we can say that improving factor markets may or may not benefit the supplier. It may benefit him in the sense that as he gets access to inputs by himself, there is no inefficient separation anymore. Hence, even at low values of p_h, suppliers obtain access to the necessary inputs. However, the share of total income which accrues to the supplier may be lower in a pure output contract than in an interlinked contract. This relates to Marcoul and Veyssiere (2008)'s result that (poor) suppliers who require incentive payments to comply with the contract, will receive a better price than (rich) suppliers who do not (as they do not require input provision).

Aggregate Effect of Development

If we maintain the model set-up where inputs are fully provided by the buyer, the impact of development can be summarized as follows:

$$\frac{\partial Y}{\partial \Omega} = \frac{\partial Y}{\partial M} \cdot \frac{\partial M}{\partial \Omega} + \frac{\partial Y}{\partial \bar{l}} \cdot \frac{\partial \bar{l}}{\partial \Omega} + \frac{\partial Y}{\partial p_s} \cdot \frac{\partial p_s}{\partial \Omega} \tag{11}$$

with $\partial Y/\partial M = 0$, $\partial Y/\partial \bar{l} \geq 0$, $\partial Y/\partial p_s \geq 0$ if $M > \varepsilon$; $\partial Y/\partial M < 0$ if $M = \varepsilon$; and $\partial Y/\partial \bar{l} \geq 0$, $\partial Y/\partial M = 0$, and $\partial Y/\partial p_s = 0$ if $M < \varepsilon$. As long as the third party enforcement condition is not binding, development will have a positive (or no) effect on *Y*, because the supplier's opportunity cost of labor ($\bar{l}$) and his pay-off from side-selling (p_s) is improving. If third party enforcement is binding, development will only have a positive (or zero) effect through an increased opportunity cost of labor ($\bar{l}$), as opportunistic behavior by the supplier is ruled out.

However, *Y* shows a discontinuous jump down where third party enforcement becomes binding, i.e. at the point $M = \varepsilon$, where the buyer is indifferent between using a self-enforcing contract or third party supervision. The effect of development on this point is:

$$\frac{\partial [M - \varepsilon]}{\partial \Omega} = \frac{\partial M}{\partial \Omega} - \frac{\partial \varepsilon}{\partial \bar{l}} \cdot \frac{\partial \bar{l}}{\partial \Omega} - \frac{\partial \varepsilon}{\partial p_s} \cdot \frac{\partial p_s}{\partial \Omega} \tag{12}$$

with $\partial \varepsilon/\partial \bar{l} \leq 0$ and $\partial \varepsilon/\partial p_s \geq 0$. Hence, the impact of development on the use of third party development is ambiguous: term 2 is positive or zero, and term 1 and 3 are negative or zero. This means that if the impact of a reduced enforcement cost (*M*) and/or of an increased pay-off from side-selling prevail, development

[17] However, even in the case of pure output contracts, inefficient separation (i.e. underinvestment) may arise if p_s and φ^p are low, such that $p_s < \bar{k} + \bar{l} - \varphi^p - \varphi^f$ as in equation (5). To analyze the case of pure output contracts with specific investments in greater detail, a different model set-up may be required. A very insightful discussion of the case where suppliers do not face credit constraints, but buyers choose to do part of the upfront investment to make contracts self-enforcing, is provided in Gow, Streeter and Swinnen (2000).

will lead to a higher incidence of third party enforcement. If, on the contrary, the impact of the increased opportunity cost of labor ($\bar{l}$) is dominant, development may reduce the use of third party enforcement.

Finally, we can derive the effect of development on contract feasibility:

$$\frac{\partial p_h^{min}}{\partial \Omega} = \frac{\partial p_h^{min}}{\partial M} \cdot \frac{\partial M}{\partial \Omega} + \frac{\partial p_h^{min}}{\partial \bar{l}} \cdot \frac{\partial \bar{l}}{\partial \Omega} + \frac{\partial p_h^{min}}{\partial p_s} \cdot \frac{\partial p_s}{\partial \Omega} \tag{13}$$

with $\partial p_h^{min} / \partial M \geq 0$, $\partial p_h^{min} / \partial \bar{l} \geq 0$, and $\partial p_h^{min} / \partial p_s \geq 0$. While term 1 is negative or zero, term 2 and 3 are positive or zero, yielding again an ambiguous outcome.[18] This implies that, with an interlinked contract, if the effect of cheaper third party enforcement dominates, development will increase contract feasibility. If however the increased $\bar{l}$ and p_s have the strongest impact, development will reduce contract feasibility. Note that, if suppliers can, because of development, get direct access to inputs, contract feasibility is expected to improve (unless p_s is really low, such that $p_s < \bar{k} + \bar{l} - \varphi^p - \varphi^f$) as in equation (5)).

As a conclusion, we can state that both parties may benefit from development, primarily through a decrease in the incidence of contract breakdown. However, some aspects of development may as well reduce contract feasibility (i.e. the increase in $\bar{l}$ and in p_s). Further, even if development in many cases will have a positive impact on the supplier's payoff, under some conditions, he will (perhaps surprisingly) suffer a loss, as cheaper third party enforcement will deprive him from his efficiency premium, and reduce his income.

[18] Note that development will as well have an ambiguous impact on $\varphi^p{}_{min}$ in equation (5).

6. CONCLUSION

This paper argues that if quality requirements create the need for specific input use, buyers have the incentive to invest in farmers in order to upgrade the raw material on offer, for example by providing inputs on credit. This creates various holdup opportunities for farmers, and as such, buyers are forced to offer them attractive contract terms in order to secure their returns to investment. Hence, poor suppliers can benefit from the introduction of quality standards in a weak contract enforcement context, even if all bargaining power lies with the buyer.

More precisely, we show that if factor market imperfections induce interlinked contract arrangements, the extent of inefficient separation (absence of socially efficient contracting) is increasing in the enforcement costs and in the value of specific inputs required for high value production. The distribution of the gains from contracting depends on the overall rents that can be created and on the enforcement costs.

If third party enforcement (formal or informal) is very costly, buyers may prefer to make the contract self-enforcing by means of an additional money transfer to the supplier, which we call an "efficiency premium". Because of this efficiency premium, weak contract enforcement may under some conditions increase the supplier's income.

Moreover, we find that "development", i.e. an exogenous improvement of factor markets and enforcement institutions may hurt some of the contracting parties under some conditions. More specifically, the analysis shows that as enforcement institutions develop, it will be cheaper to enforce contracts through third-party enforcement, and efficiency premiums are less likely. In general, efficiency will increase. First, because the incidence of inefficient separation is expected to diminish; second, because third party enforcement is becoming cheaper and therefore has a less depressing impact on the contract surplus. Nevertheless, for some values of θ, efficiency rather decreases, as third party enforcement is substituting for efficiency premium payment. Further, especially for lower values of p_h, the share of total income that accrues to the supplier may go down with development, as he misses out on his efficiency premium.

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